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STUDY IN INSTRUMENTS MAKING

As observed by the eminent scientist Dr.Raja Ramanna, presently our Patron-in-chief, advantages of improvements effected through the advancement of Science & Technology have not been made use of in our Musical Instrumentation. This was the observation in one of the inaugural addresses of our annual Thaalavaadyotsav. [Copy of the Monograph released is enclosed for ready reference].

Since then, efforts are being made to study our method of making of instruments, which have mostly been traditional in our regular manufacture and maintenance, especially in the field of percussions. Some of the earlier findings published from time to time are enclosed herewith for ready reference.

Indian drums are unique in their construction and tonal qualities. All drums categorised under "Avanaddha Vadya" [Percussion Instruments] necessarily make use of "animal skin" as the vibrating membrane. The tonal specification, membrane tension are the two main variables involved. Also, the size and shape of the skeletal drum made of wood / mud definitely contributes to the same. Each individual instrument becomes "pitch specific" due to its physical

quantities like diameter, length, thickness of the drum and also the thickness of the "Karanai". Till date, all Indian drums are being manufactured as a family tradition. So, many of the trade secrets are kept confidential and therefore left unpublished. While the percussionist needs to know the nuances of technicalities of tuning instruments, it becomes a primary concern to know the structure and the behaviour of the materials used in manufacturing these instruments. Of late, some inquisitive artistes have tried alternate materials for Karanai, skeletal drum, Varu [the leather strap binding the left and right drum heads, keeping the required tension] and the paste applied on the left [Rava paste] successfully. However, the materials have not been tested scientifically for standardising their use.

All musical instruments are manufactured as per individual standards. Though this is for the convenience of the artist who plays the instrument, it will be a welcome move to draw relevant specifications [IS and BS codes] for different variable quantities of different musical instruments, so that the Musical instrument manufacturing becomes a more accessible industry in future, catering a standard product of specific quality. Need of alternate materials for Percussion Instruments, arises as a result of non-availability of the requisite quality of the required
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quantity of wood and hide. As these materials are prone to damages soon, and their machinability is also poor, use of these materials become more difficult in future where there will be no skilled artisan who may be able to handle these skilled jobs with proper care as per the existing traditional artistry. All alternate materials should be machinable so that the batch processing / manufacturing would be achieving economically ensuring uniform quality. Such projects intend to find a solution in two stages, i.e., Interim Relief and Long Term Measures. In the first stage, it aims at finding the alternate Woods [as a substitute for jack tree, which is not available in large and good quantities] etc. It also considers the market strategies. Since this branch comes under [Leathers etc.], Ministry of Textiles, it would also provide employment opportunities under Handicrafts Division. In the next stage, a long term solution for a permanent measure, it aims at collecting the required data [of the skins used, woods used etc.] from a physicist, scientist, artisan, artist, dealer etc. and aims at suggesting the substitute materials for the above percussion instruments. These were discussed at great length at a meeting convened for discussing "R&D activities pertaining to Leathers and Woods for Percussion Musical Instruments" held in Bangalore on 30.5.1999. Copy of the

proceedings of this vital meeting is enclosed for ready reference.

A further meeting to discuss the "Study of Instruments Making" was held on 9.1.2000, proceedings of which are also enclosed separately for ready reference.

An initial R&D study on use of alternate materials for Percussion Instruments with special reference to Mridanga, Tabla and Pakhraj was studied to find suitable alternatives. The various leathers used in the process were carefully studied for replacement in future. The leathers collected from various manufacturers have been collected and have been planned to be sent to Central Leather Research Institute [CLRI], Chennai, Government of India for a thorough analysis. The right drum head consists of three layers of leathers. The leathers used are that of Goat and Calf [or Cow]. The inner most layer and the middle layer is that of goat, while the outer most layer is that of calf. The inner most layer is that of goat and is mainly used to separate the vibrating membrane [middle layer] from the wood, so that the vibrations are not cut out. The second or middle layer is once again that of the leather of goat. This is referred to as the vibrating membrane or the vibrating layer [the Karani is applied on this, layer by layer, on this membrane at a later stage] The outer most layer that of calf is

referred to as "meettu layer". The construction is explained below and relevant photographs have also been enclosed.

1. All the leathers are neatly planned and a small hole is made on the outermost and innermost membranes.
2. The three membranes are held together one above the other [refer pictures 1 & 2].
3. They are stitched together with a leather strap and are placed on the right face of the wood [refer picture No.3].
4. Then using the iron ring for support on the other side, the leathers are tied to the ring through the 'baaru' [refer picture 4].
5. The 'baaru' is tightened evenly on all sides. The tune is supposed to be the same on all sides [refer picture 5].
6. Holes are made on all the sides using a wooden slag, the leathers are stitched using buffalo leather. This is a very complex process and a very important step in the construction. The right face is allowed to dry completely [refer picture 6].
7. Here, the right drum-head is complete. [refer picture 1 & 2].

The conventional method of construction of Left Drum Head:

The left drumhead mainly consists of two layers, inner and outer. The outer layer inturn may consist of one or more layers. While the inner layer is that of goat, the outer is that of buffalo. The inner layer is the vibrating membrane and is attached to the outer membrane only at the end i.e. after constructing the left drumhead.

1. Tanned leather of buffalo is taken in one or more layers and cut in a circular shape [maximum of three or four layers, depending upon the thickness required]. They are kept one above the other and a small hole is made on the outermost layer [Refer picture 7 & 8].
2. These layers are kept above the left side of the drum and using an iron ring as shown they are tried tightly to the ring using a baaru. [See picture 9].

While the above processes are going on for generations from skilled artisans, recent attempts to separate the drumheads are being studied. One of our Bangalore based, Mridangam manufacturer who is also an exponent of the Mridangam art has successfully attempted in separating the two drumheads. This has already been done in the case of Dolu [Thavil] used for Nagaswara recitals mostly and currently in use for other Musical recitals like Saxophone, Violin etc. Samples of these instruments have been tried out by Senior performing artistes who have felt that the new instrument may be tried extensively in concerts. .7

It is hoped that the instruments making will become more scientific in future enabling the performers to make use of the instruments with better effect.

An attempt was made to visit the actual manufacturing spot of Ghata at Devanahally near Bangalore. The processes of manufacture by one of the veteran manufacturers Krishnappa and his family were studied. Photographs pertaining to their processes are also enclosed for ready reference. It is further proposed to study these aspects so that these Ghatas can be manufactured to the required "Sruthi" [tune]. At present, Ghata players are forced to select whatever instruments are made at whatever "Shrutis" [tunes] available. It has also been not possible to tune finely these instruments exactly to the required "pitch" of the artistes whom the Ghata Artistes are invited to accompany.

Similar attempts are being made to examine use of alternate skins for the use of Khanjari [Kanjira] where the use of certain skins are prohibited by the government as these are preserved species.